In the Specification:

On page 1, after the title insert the following:

RELATED APPLICATIONS

This is a U.S. national stage of application No. PCT/DE2005/000170, filed on February 2, 2005.

On page 1, amend the paragraph beginning on line 7 as follows:

This patent application claims the priority of German patent application no. 10 2004 009 284.2-33 filed February 26, 2004, the disclosure content of which is hereby incorporated by reference.

On page 1, before line 11, insert the following heading:

FIELD OF THE INVENTION

On page 1, amend the paragraph beginning on line 11 as follows:

The invention relates to a light emitting diode arrangement for high power light emitting diodes which are mounted onto a flexible ~~printed~~ circuit board. Furthermore, the invention relates to a method for producing the light emitting diode arrangement.

On page 1, after line 15, insert the following heading:

BACKGROUND OF THE INVENTION

On page 1, amend the paragraph beginning on line 17 as follows:

~~The document DE 199 22 176 A1~~ US Patent No. 6,848,819 B1 describes a light emitting diode array which is surface-mounted on a flexible board and which is applied on a heat sink. In this case, the heat sink may have any desired form, so that motor vehicle ~~luminaires~~ lamps such as flashing indicators or the like can be constructed which can be adapted to the external contour of the vehicle.

On page 1, before line 25, insert the following heading:

SUMMARY OF THE INVENTION

On page 1, amend the paragraph beginning on line 25 as follows:

It is an object of the present invention to ~~specify~~ provide a light emitting diode arrangement for high power light emitting diodes which is particularly easy to mount. Furthermore, it is an object of the invention to ~~specify~~ provide a method for producing such a light emitting diode arrangement.

On page 1, delete the paragraph beginning on line 32 through line 36 in its entirety and insert the following:

These and other objects are attained in accordance with one aspect of the present invention directed to a light emitting diode arrangement, comprising a flexible circuit board and at least one high power light emitting diode mounted onto the flexible circuit board.

On page 1, amend the paragraph beginning on line 38 through page 2, line 10 as follows:

A light emitting diode arrangement having at least one high power light emitting diode is specified. In this case, the high power light emitting diode is mounted onto a flexible ~~printed~~ circuit board. In this connection, high power light emitting diodes are understood to mean ~~so-called high power~~ light emitting diodes which have a power consumption of at least 300 mW. The typical power consumption for a high power light emitting diode lies between 1 and 3 W. One example of such a high power light emitting diode is, for example, the light emitting diode known from ~~the document DE 101 17 889 A1~~ published US patent application no. 2004/0075100A1.

On page 2, amend the paragraphs beginning on lines 12, 20 and 30 as follows:

On account of their relatively high power consumption, high power light emitting diodes exhibit a thermal emission. ~~There, the dragon~~ The light emitting diode known from published US patent application no. 2004/0075100A1 ~~mentioned~~ has a thermal connection part which bears on a mounting carrier and by means of which the heat arising during operation of the LED is emitted to the mounting carrier.

In the present light emitting diode arrangement, the mounting carrier is provided by a flexible ~~printed~~ circuit board. In one preferred embodiment of the light emitting diode arrangement, the high power light emitting diode is soldered onto the flexible ~~printed~~ circuit board. By means of the soldering process the light emitting diode is both electrically contact-connected to the flexible ~~printed~~ circuit board and mechanically fixed on the ~~printed~~ circuit board.

In one preferred embodiment, the flexible ~~printed~~ circuit board contains at least one flexible carrier layer. In this case, the flexible carrier layer preferably contains one of the following materials: polyimide, polyethylene naphthalate, polyester, FR4. Other materials may also be suitable for use in the flexible carrier layer of the ~~printed~~ circuit board if, in this case, the flexibility of the ~~printed~~ circuit board is preserved and good transmission ~~forwarding~~ of the heat generated by the high power light emitting diode is ensured by the carrier layer.

On page 3, amend the paragraph beginning on line 4 as follows:

The flexible ~~printed~~ circuit board furthermore preferably contains a thermally conductive layer. This thermally conductive layer is in thermal contact with the high power light emitting diode.

On page 3, amend the paragraph beginning on line 26 through page 4, line 2 as follows:

In one embodiment of the light emitting diode arrangement, the thermally conductive layer and also the electrical conductor tracks are situated in the same plane of the flexible ~~printed~~ circuit board. The thermally conductive layer is preferably a separate layer. That is to say that the thermally conductive layer and electrical conductor tracks are situated in a common plane of the flexible ~~printed~~ circuit board, but are not connected to one another. In particular, the thermally conductive layer is not in electrical contact with the conductor tracks. By way of example, the thermally conductive layer is in thermal contact with a thermal connection part of the light emitting diode as described above.

On page 4, amend the paragraph beginning on line 12 as follows:

In one embodiment of the light emitting diode arrangement, one of the surfaces of the flexible ~~printed~~ circuit board is covered with an electrically insulating layer. The insulating layer preferably contains soldering resist. In one particularly preferred embodiment, the insulating layer has cutouts for making thermal and electrical contact with the high power light emitting diode. Through said cutouts, the high power light emitting diode may for example be thermally connected to the thermally conductive layer and electrically connected to the conductor tracks.

On page 4, amend the paragraph beginning on line 24 as follows:

In one particularly preferred embodiment of the light emitting diode arrangement, an adhesive-containing layer is applied to that side of the flexible ~~printed~~ circuit board which is remote from the high power light emitting diodes. In this case, said adhesive-containing layer is preferably formed by a double sided adhesive tape which is adhesively bonded by one of its adhesive surfaces onto the flexible ~~printed~~ circuit board in such a way that it completely covers the ~~printed~~ circuit board and terminates flush with the latter at the edges.

On page 4, amend the paragraph beginning on line 36 through page 5, line 6 as follows:

In order to prevent inadvertent adhesive bonding on the ~~printed~~ circuit board, the adhesive tape fixed on the ~~printed~~ circuit board is preferably sealed with a protective film at its free surface. Before the light emitting diode arrangement is applied at its intended location, said protective film merely has to be pulled off. In other words the light emitting diode arrangement can be adhesively bonded onto its intended location in <u>terms of a decal picture</u> ~~the sense of a transfer~~.

On page 5, amend the paragraph beginning on line 24 as follows:

A particularly thin adhesive-containing layer having a maximum thickness of 60 μm is particularly preferred in this case. As a result, on the one hand it is ensured that the light emitting diode arrangement is very thin overall, and on the other hand the heat emitted to the flexible ~~printed~~ circuit board from the high power light emitting diode is conducted particularly well through such a thin layer and can then be emitted from there to the surroundings, for example the area onto which the light emitting diode arrangement is adhesively bonded.

On page 5, amend the paragraph beginning on line 36 through page 6, line 3 as follows:

In one particularly preferred embodiment of the light emitting diode arrangement, a multiplicity of high power light emitting diodes are applied on the flexible ~~printed~~ circuit board. In this case, the high power light emitting diodes are preferably connected in series.

On page 6, amend the paragraph beginning on line 17 as follows:

In one particularly preferred embodiment of the light emitting diode arrangement, said sections are arranged in a series. The arrangement described makes it possible to make contact with the totality of the high power light emitting diodes on the flexible ~~printed~~ circuit board by connecting the two outermost contact areas – at opposite sides of the light emitting diode arrangement – on the ~~printed~~ circuit board to a current source.

On page 7, amend the paragraph beginning on line 27 as follows:

Owing to its particularly good thermal conductivity, the heat sink preferably contains a metal. In one embodiment of the illumination device, the heat sink is part of a ~~luminaire~~ lamp housing. In one particularly preferred embodiment, the luminiare housing is a housing for an automobile interior illumination, an automobile rear illumination, a brake light, a flashing indicator, or the like. The light emitting diode arrangement is adapted to the form of the respective ~~luminaire~~ lamp housing on account of the flexible ~~printed~~ circuit board.

On page 8, amend the paragraph beginning on line 1 as follows:

Furthermore, another aspect of the present invention is directed to a method for producing a light emitting diode arrangement is specified. In this case, firstly an adhesive-containing layer is applied to the flexible ~~printed~~ circuit board. Afterward, the light emitting diodes are soldered onto that side of the ~~printed~~ circuit board which is remote from the adhesive-containing layer. In this case, the application of the adhesive-containing layer may be effected before the soldering operation, since a particularly heat-resistant adhesive is used. This order of the production process also proves to be particularly advantageous since the adhesive-containing layer can be applied particularly simply to the flexible ~~printed~~ circuit board without light emitting diodes mounted beforehand.

On page 8, delete the paragraph beginning on line 17 through line 19 in its entirety.

On page 8, before line 21, insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

On page 8, amend the paragraph beginning on line 21 as follows:

Figure 1 shows a schematic illustration of the surface of the flexible ~~printed~~ circuit board of the light emitting diode arrangement.

On page 8, amend the paragraph beginning on line 29 as follows:

Figure 3 shows a sectional view along line A-A' in Fig. 2 through a single section of the multi-section light emitting diode arrangement.

On page 8, before line 32, insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

On page 8, amend the paragraph beginning on line 32 through page 9, line 4 as follows:

Figure 1 shows the surface of the flexible ~~printed~~ circuit board 10 of the light emitting diode arrangement subdivided into six sections 11. In this case, Figure 1 shows the top side of the ~~printed~~ circuit board 10, to which the light emitting diodes 34 can be applied. The surface of the flexible ~~printed~~ circuit board 10 is covered with an insulating layer 12. Situated in the insulating layer 12 are cutouts through which a connection to the electrical connection locations 13, the thermal contact area 14 and the electrical contact areas 15 is possible.

On page 9, amend the paragraphs beginning on lines 12, 16, and 26 as follows:

The flexible ~~printed~~ circuit board 11 has an insulating layer 12 at its surface. The insulating layer 12 is provided by a layer containing soldering resist.

The electrical connection locations 13 are situated below cutouts in the insulating layer 12. At the electrical connection locations 13, a high power light emitting diode is electrically contact-connected and mechanically fixed to the flexible ~~printed~~ circuit board. In this case, electrical contact-connection and mechanical fixing of the high power light emitting diode preferably take place by means of a soldering connection.

The thermal contact area 14 is situated below a cutout in the insulating layer 12. At the thermal contact area 14, the high power light emitting diode is thermally coupled to the thermally conductive layer. The thermal connection part of the high power light emitting diode and the thermally conductive layer are preferably contact-connected at the thermal contact area 14 by means of a soldering connection. ~~, so that an additional~~ Besides a thermal contact-connection, this solder connection provides a mechanical fixing of the high power light emitting diode to the flexible ~~printed~~ circuit board ~~is effected besides the thermal contact connection~~. However, a thermally conductive temperature-stable adhesive may also be used as an alternative to the soldering connection.

On page 10, amend the paragraph beginning on line 11 as follows:

Figure 2 shows the plane of the ~~printed~~ circuit board 10 with the thermally conductive layer 21 and the electrical conductor tracks 22, 23 of the flexible ~~printed~~ circuit board 10.

On page 10, amend the paragraph beginning on line 26 as follows:

By way of example, the thermally conductive layer 21 may have an essentially round form. By way of example, the thermally conductive layer 21 occupies at least 60 percent of the area of the plane of the ~~printed~~ circuit board 10 in which it is situated. It preferably occupies at least 70 percent, particularly preferably at least 80 percent.

On page 11, amend the paragraph beginning on line 6 as follows:

The construction of the light emitting diode arrangement shown makes it possible in this case to sever the light emitting diode arrangement along the line C-C', for example without restricting the contact-connection possibilities. Two ~~printed~~ circuit boards 10 each comprising three high power light emitting diodes arise as a result in this example.

On page 11, amend the paragraph beginning on line 26 as follows:

Figure 3 shows a sectional view through a single section 11 of the light emitting diode arrangement along the sectional line A-A'. In this case, the light emitting diode arrangement comprises a flexible ~~printed~~ circuit board, onto which is mounted a high power light emitting diode 34 with its electrical connection parts 35 and its thermal connection part 36. In this exemplary embodiment, the flexible ~~printed~~ circuit board comprises the following layers: a protective film 31, an adhesive-containing layer 32, a carrier layer 33, the thermally conductive layer 21 and the electrical conductor tracks 22, 23, and also an insulating layer 12.